THIN-FILM TRANSISTORS FORMED ON A FLEXIBLE SUBSTRATE

ABSTRACT OF THE INVENTION

A method for is provided forming a thin-film transistor (TFT) on a flexible substrate. The method comprises: supplying a metal foil substrate such as titanium (Ti), Inconel alloy, stainless steel, or Kovar, having a thickness in the range of 10 to 500 microns; depositing and annealing amorphous silicon to form polycrystalline silicon; and, thermally growing a gate insulation film overlying the polycrystalline. The silicon annealing process can be conducted at a temperature greater than 700 degrees C using a solid-phase crystallization (SPC) annealing process. Thermally growing a gate insulation film includes: forming a polycrystalline silicon layer having a thickness in the range of 10 to 100 nanometers (nm); and, thermally oxidizing the film at temperature in the range of 900 to 1150 degrees for a period of time in the range of 2 to 60 minutes. Alternately, a plasma oxide layer is deposited over a thinner thermally oxidized layer.